

tons of wax, and 49,600 tons of sulphate of ammonia. The coloured geological map and the sections accompanying the memoir are excellent, but the illustrations in the text are crude and roughly reproduced.

IN the *Electrician* of January 11 is an interesting article by Mr. G. W. Pickard on the measurement of received energy at wireless stations, reprinted from the *Electrical Review* of New York, which should appeal to all who are watching the development of wireless telegraphy. The method described by the author is both simple and useful, and does not require an elaborate arrangement of instruments. A telephonic mode of reception is employed, and the sound of a single spark at the sending station is reproduced in the telephone by the discharge of a local condenser through the same receiving circuits, the charging potential of the condenser being made equal in intensity by variation until this is accomplished. The periodicity of the condenser discharge is the same as that of the received energy. Then knowing the potential and capacity of the condenser, the energy can be deduced by a simple formula. An objection to the method is the difficulty in comparing successive sounds, which cannot be accomplished with any degree of accuracy. Also a slight change of spark-length at the sending station would seriously affect results, and therefore make comparisons of the sending station's performance from day to day almost impossible. The author mentions a method by which this may be partly overcome by the insertion of a key in the detector circuit, so as to secure the sending of a truly single spark. At the same time, the method described will be useful as a rough test in practical work, and should help towards the solution of a true formula for long-distance work.

WE have received from Mr. T. A. Vaughton, Sutton Coldfield, a communication entitled "'Growing' Alumina," which gives particulars of phenomena observed during the passage of electric sparks between a globule of mercury, acting as anode, contained in a drawn-out capillary tube placed vertically a few millimetres above an aluminium plate, which serves as cathode. While sparks are passing, a circular "crater" composed of nearly pure alumina in a light, feathery form grows round the sparking spot, and after a short time the quantity of the product formed is considerable. In appearance it resembles moss; when examined with a lens during its formation, filaments are seen to shoot along the surface of the aluminium in definite directions. If the sparking be stopped and the deposit removed, the formation of the moss again occurs without the current being necessary, and the process may be repeated several times in succession. In an atmosphere of hydrogen no alumina is formed, and in oxygen but little growth occurs. The alumina produced acts on a photographic plate even through celluloid. A contributor to whom we have submitted the communication informs us that the phenomena are probably due to the formation of aluminium amalgam owing to mercury being sprayed upon the plate by the sparks. It is decomposed by atmospheric moisture, giving alumina and mercury, which is free to repeat the process. Little action occurs in oxygen because of the need of a supply of water vapour. The photographic action occurs owing to the production of hydrogen peroxide, which will attack a photographic plate through celluloid; hydrogen peroxide is generally formed in similar oxidations.

THE *Memoirs of the Liverpool School of Tropical Medicine*, twenty-one of which have been published, are to be superseded by a periodical which is to be issued by

the school under the title of *Annals of Tropical Medicine and Hygiene*. The annals will be edited by Prof. Ross, in collaboration with Drs. Stephens, Todd, Thomas and Breinl, Mr. Newstead, and Sir Rubert Boyce.

THE report on the scientific results of the voyage of the *S.Y. Scotia* is to be published in six quarto volumes by the Scottish Oceanographical Laboratory. The first volume will contain a narrative of the voyage and a summary of results, the second will deal with the physical results of the expedition, the third with botany, geology, and cartography, and vols. iv., v., and vi. with the numerous branches of zoology. The work will be fully illustrated with maps, plates, and photographs. Each volume will consist of several parts, which will be published separately when ready. Vol. ii. will be issued first, and will be ready immediately. It will consist of five parts, dealing respectively with meteorology, magnetism, bathymetry, physics of the ocean, and tides and waves. Orders, accompanied by a remittance for vol. ii., 42s., should be sent to the director, Scottish Oceanographical Laboratory, Surgeons' Hall, Edinburgh.

#### OUR ASTRONOMICAL COLUMN.

THE TEMPERATURE OF THE MOON.—In a paper appearing in the *Astrophysical Journal* (No. 5, vol. xxiv.), Mr. F. W. Very discusses Mr. Coblentz's recently-published conclusion that, from an investigation dealing with the reflection of heat radiations from various mineral substances, it may be deduced that the apparent temperature of the lunar surface is chiefly due to reflected solar radiations, and that the *actual* temperature may be about  $-225^{\circ}\text{C}.$ , in accordance with Langley's first conclusion. Mr. Very points out that his investigations of the radiations show that the larger part of them are not merely specularly reflected, but are radiated, the moon having first absorbed the heat from the solar radiations. Instead of  $-225^{\circ}\text{C}.$ , he suggests that the temperature of the lunar body may reach a maximum of about  $100^{\circ}\text{C}.$ , the corrected lunar-radiation curve being similar to that appertaining to bodies not much below the temperature of boiling water.

THE HELIUM LINE,  $D_3$ , IN THE SOLAR SPECTRUM.—In a communication to the *Observatory* (No. 379) Mr. Buss, of Ashton-on-Mersey, states that he has repeatedly seen the helium line,  $D_3$ , as a dark line, when examining parts of the solar disc, within the sun-spot zone, on which there were no telescopic signs of unusual activity. He has previously recorded the appearance of this line in the region of various spots, but never in the spot umbra itself, and thinks that it might be found very often if continuous observations were made for the purpose. He also suggests the possibility of  $D_3$  being a regular feature of the Fraunhofer spectrum, the line being too fine to be seen with our present instruments, except on occasions when the region examined is subject to some slight disturbance.

A WHITE SPOT ON JUPITER'S THIRD SATELLITE.—In No. 4147 of the *Astronomische Nachrichten*, Senor José Comas Solá, director of the Fabra Observatory, records the observation of a white spot near the north pole of Jupiter's third satellite on November 23, 1906. The observation was made with powers of 450 and 750 on an equatorial of 38 cm. aperture, and with the latter magnification the spot was seen, with great facility, as being intensely white and bordered by a very dark area; Senor Solá thinks that much smaller instruments may reveal this feature. With a steady image other, dark, spots were seen, the whole disc of the satellite appearing as a reduced image of Mars. The observation was made between 13h. and 14h. 15m., but no displacement of the spot was detected.

A REMARKABLE NEBULA.—On some plates taken during September, 1906, Prof. Max Wolf has found an extended nebula near to the star 26 Ceti. Practically all extended nebulosities are situated in or near to the Milky Way, but this is a remarkable exception, for it is removed some

70° from the plane of the galaxy, the position of its densest part being R.A.=oh. 57.4m., dec.=+1° 20' (1885).

This nebulosity is also remarkable in appearance; around the densest region there extends a quantity of nebulous matter of varying intensity showing small clouds of increased intensity at several points. Further out the intensity becomes so feeble that it is impossible to define its limits, and Prof. Wolf expects that a longer exposure than the four hours which he gave may materially extend the nebulosity seen on the plate. Three B.D. stars are involved in the cloud, which extends about 40' in declination and 30' in R.A. When examined under the microscope the brighter parts of the image are filled with numerous minute spots and short trails, and Prof. Wolf thinks it possible that the cloud may consist of a multitudinous congregation of very small planetary nebulae which a more powerful instrument may be able to resolve. The present plates were taken with the 16-inch Bruce telescope (*Monthly Notices*, November, 1906).

**PERIODICAL COMET DUE TO RETURN IN 1907.**—Only one periodical comet is due to return during the current year, that discovered by Giacobini at Nice on December 20, 1900. As observed then it was very faint, and showed only a small nebulous disc, without any tail. As its period is about seven years, according to the elements calculated by Prof. Kreutz, and as it passed through perihelion about December 3, 1900, it is not likely to be rediscovered until nearly the end of the present year (the *Observatory*, No. 379).

**ORBITS OF THREE DOUBLE STARS.**—The results of an investigation, by Prof. Doberck, of the orbits of  $\zeta$  Cancri,  $\omega$  Leonis, and H139 ( $\Sigma$  3062), are published in Nos. 4144-5 of the *Astronomische Nachrichten*. The author gives a set of elements for the orbit of each system, and compares all the available observations with the calculated places; from a discussion of the whole he gives the probable error of the annual means of each observer's measures. According to the final elements, the respective periods of these three systems are approximately 60, 116.7, and 105.5 years.

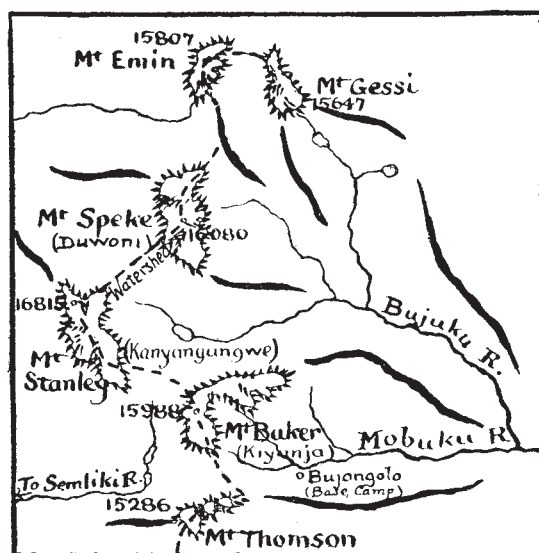
### THE DUKE OF THE ABRUZZI'S ASCENTS IN THE RUWENZORI RANGE.

AT a crowded meeting of the Royal Geographical Society, held at the Queen's Hall on January 12, and honoured by the presence of the King and the Prince of Wales, the Duke of the Abruzzi gave an interesting account of his recent exploration of the snowy summits of the Ruwenzori range. It will be remembered that many attempts on these peaks have been made within the past few years, but that, owing rather to the climatic character of the range and its distance from an accessible base than to special difficulties from a mountaineer's point of view, all the Duke's predecessors had failed to reach its culminating point. Profiting by the experience of these, the Duke was able to avoid the causes of their failure, his expedition being provided with all that forethought could suggest in the way of equipment, while he was also fortunate in securing trustworthy information as to the times of year at which the climatic conditions were likely to be most favourable.

The Duke was accompanied by two Alpine guides and two porters, all from Courmayeur, as well as by experts entrusted with research in various scientific departments, including Major Cagni, his trusty companion on his previous expeditions, and Signor Sella, well known for his unique experience in mountain photography. Apart from the mountaineering interest of the expedition, there was much to be done before the topography or morphology of the range could be at all thoroughly understood. Captain Behrens, of the Anglo-German Boundary Commission, had, by triangulation, fixed the altitude of the highest summit within very narrow limits, and shown that it was much under the 20,000 feet attributed to it by some travellers. He had also fixed with considerable accuracy the position of the double-culminating peak, recognised as the Kanyangungwe of Stuhlmann, but the number and

relative positions of the several *massifs* were still matters of uncertainty.

It is unnecessary to refer to the first part of the Duke's address, dealing with the journey from the coast and final organisation of the expedition. The route adopted (after much deliberation) for the approach to the snows was that from the east by the Mobuko valley, followed by Moore, Johnston, Grauer, and others. During the toilsome march up this the Duke saw reason to doubt its being the best, and he subsequently found that the Bujuko, a northern branch, or even the main head-stream, of the Mobuko, possessed some advantages. After the usual difficulties had been overcome, the snows were at last reached, and a view of all the peaks obtained from a ridge running east from Kiyanja. To the north, four distinct snowy mountains, separated by well-marked depressions, were in view, the nearest and most westerly being crowned by two pairs of peaks, the loftiest of which were at once recognised as those seen from Butiti both by Freshfield and the Duke, while evidently quite distinct from the Duwoni of Johnston. This had already been suspected by Mr. Freshfield after receiving the account of Mr. Wollaston's ascents. After ascending to the summit of Kiyanja it was decided to make a circuit to the south of this mountain, and after descending into a valley belonging to the



Rough Sketch of the Ruwenzori Peaks.

Semliki system, to strike north for the saddle between the two highest peaks. During the descent of this valley a striking sunset view over the great Congo forest was obtained, and the Duke's description was well reinforced by one of Signor Sella's striking photographs. The ascent was successfully accomplished by the Duke and the guides on June 18, the chief difficulty arising from the mists and from an overhanging cornice, which required great care to negotiate. A peculiar feature was the presence of huge "ice-stalactites," which supported the cornice. The twin peaks received the names of the Queens of Italy and England. Between June 22 and July 10 the Duke ascended all the main peaks, while his coadjutors prosecuted their own several tasks, Major Cagni completing an excellent map, while Signor Sella pursued his photographic labours, of the admirable results of which the audience had many specimens.

To the individual *massifs* and peaks the Duke has given the names of distinguished explorers of the region and of Royal personages, although it may be doubted by some whether the native names which have already found their way into Ruwenzori literature are not more in harmony with the romantic aloofness of the range than any exotic appellations, however otherwise suitable. Even though not strictly belonging to the summits, the native